Two-time scales matrix decomposition for wastewater treatment plant

Abstract

The purpose of this work is to identify two-time scales matrix decomposition of wastewater treatment plant. Wastewater plant is naturally aim to remove suspended substances, organic material and phosphate before releasing to recipients. Initially, the MIMO system is excited with generalized binary noise signals and estimated with robust numerical subspace state-space system identification. The performance of identified models is then validated by variance accounted for. Next, the block diagonalisation procedures are implemented in decoupling the system with two-time property into slow and fast subsystem. It was observed that the identified model possess two-time scales behavior's presented by separated clusters of eigenvalues. Besides, similar dynamic responses were obtained by decoupled systems compared to actual full model at lower frequency that is highly demanded in control design application. The study leads to future improvement on wastewater control strategies.